REMARKS

The present invention relates to methods for treating a subject in need of increased natriuretic peptide function. The methods comprise administering one or more inhibitors of prolyl-specific DPP to the subject in an amount sufficient to inhibit degradation of the natriuretic peptide.

Claims 29-33 and 43-46 are pending in the application. Applicant respectfully requests reconsideration of the claimed invention in view of the following remarks.

1. Rejection of claims 29, 32, and 43 under 35 U.S.C. § 102

Applicant respectfully traverses the rejection of claims 29, 32 and 43 under 35 U.S.C. § 102(e) as being anticipated by Haffner *et al.*, US2004/0167341.

A. *Haffner et al. does not disclose the step of selecting a subject to receive one or more inhibitors of prolyl-specific dipeptidyl peptidase based a diagnosis of congestive heart failure, as recited by the present claims*

The Haffner *et al.* patent application is cited for allegedly "teach[ing] a method for treating congestive heart failure by administering to a patient a compound that inhibits a dipeptidyl peptidase, including DPP-IV. See page 3, sections 0027-0028." Office Action, page 3. Applicants respectfully submit that this conclusion is simply not supported by the Haffner *et al.* patent application when properly considered together with the knowledge of one skilled in the art. As such, Haffner *et al.* does not disclose the step of selecting a subject to receive one or more inhibitors of prolyl-specific dipeptidyl peptidase ("DPP") based upon a diagnosis of congestive heart failure, as recited in the present claims.

According to its abstract, the Haffner *et al.* patent application is directed to "novel compounds... for inhibiting serine proteases... such as dipeptidyl peptidase IV." The section of Haffner *et al.* referred to by the Examiner states the following (emphasis added):

> The present invention also includes a method of inhibiting a post proline/analine cleaving protease comprising administering a compound of the present invention as herein described. Preferably, the post proline/analine cleaving protease is a serine protease. Preferably, the serine protease is a dipeptidyl peptidase. In one

> aspect preferably the dipeptidyl peptidase is DPP-II. In another aspect preferably the dipeptidyl peptidase is DPP-IV.
>
> The present invention also includes a method for the treatment or prophylaxis of metabolic disorders, gastrointestinal disorders, viral disorders, inflammatory disorders, diabetes, obesity, hyperlipidemia, dermatological or mucous membrane disorders, psoriasis, intestinal distress, constipation, autoimmune disorders, encephalomyelitis, complement mediated disorders, glomerulonepritis, lipodystrophy, tissue damage, psychosomatic, depressive, and neuropsychiatric disorders, HIV infection, allergies, inflammation, arthritis, transplant rejection, high blood pressure, congestive heart failure, tumors, and stress-induced abortions comprising administering a compound of the present invention as herein described. Preferably, the compound of the present invention as herein described is administered for the treatment or prophylaxis of diabetes, more preferably Type II diabetes.

It is important to note that this section of Haffner *et al.*, in addition to being nothing more than a long "wish list" encompassing literally hundreds of conditions, does not inform the skilled artisan whether a particular cited condition is treatable directly, prophylactically (or potentially by both approaches) by administering a DPP inhibitor. Instead, this section refers to treatment or prophylaxis in the alternative for the specified conditions as a group, leaving unclear whether any individual condition may be treated directly, indirectly by prophylaxis or may be addressed using both approaches.

Thus, one cannot properly conclude from the passage relied on by the Examiner in Haffner *et al.* that this reference describes administration of a DPP inhibitor for the treatment of an existing condition of Haffner *et al.* As such, Haffner *et al.* explicitly disclose the step of selecting a subject based upon a diagnosis of congestive heart failure.

Furthermore, there is other evidence in Haffner *et al.* and elsewhere that runs counter to the Examiner's assertion that this references describes the use DPP inhibitors to treat an existing case of congestive heart failure. In paragraph [0002] of the Background of the Invention section, Haffner *et al.* indicates that "[a]s examples of the therapeutic value of DPP-IV, DPP-IV is believed to be involved in a variety of metabolic, gastrointestinal, viral, and inflammatory diseases." The term "involved in" is a broad term that presumably includes conditions where DPP-IV is directly implicated in the disease (and hence is suitable for "treatment"), as well as

those conditions where DPP-IV is involved because it is implicated in a precursor to the disease (and hence is suitable for "prophylaxis").

While congestive heart failure is recited again in a long "wish list" of conditions allegedly falling under the rubric of "metabolic, gastrointestinal, viral, and inflammatory diseases," the skilled artisan understands that congestive heart failure is not itself a metabolic, gastrointestinal, viral, or inflammatory disease. Rather, as stated at the Heart Failure Society of America's "Comprehensive Heart Failure Practice Guideline Web Site (for the Examiner's convenience, excerpts from this web site are provided in an appendix of this submission):

> [Heart failure] is a syndrome caused by cardiac dysfunction, generally resulting from myocardial muscle dysfunction or loss and characterized by left ventricular dilation or hypertrophy. Whether the dysfunction is primarily systolic or diastolic or mixed, it leads to neurohormonal and circulatory abnormalities, usually resulting in characteristic symptoms such as fluid retention, shortness of breath, and fatigue, especially on exertion."

So, while Haffner *et al.* indicates that DPP-IV is believed to be "involved in" congestive heart failure, the question remaining to be answered is "how."

The skilled artisan understands that the body's response to myocardial infarction, which often causes the "myocardial muscle dysfunction or loss" that lies at the root of future congestive heart failure, does involve inflammation. *See, e.g.*, Nian *et al.*, *Circ. Res.* 94: 1543-53, 2004 (following myocardial infarction, "[t]he consequences of inflammatory cytokine effects can be favorable, leading to healing and restoration of function, or unfavorable, leading to acute cardiac rupture or chronic dilatation, paving way for heart failure."). Read with this knowledge, the statement in Haffner *et al.* that DPP-IV is believed to be "involved in" congestive heart failure means that DPP-IV is implicated as a precursor to the disease by its relationship to inflammation.

Thus, when Haffner *et al.* is considered in its entirety with the knowledge then available to the skilled artisan, to the extent that congestive heart failure could be included under the rubric of "metabolic, gastrointestinal, viral, and inflammatory diseases," it should be only be considered as a downstream effect of an earlier inflammatory condition. At best, Haffner *et al.* understands congestive heart failure as a condition that may be addressed prophylactically by addressing the upstream "inflammatory disease" that may one day lead to congestive heart failure, and not as a

condition that may be itself be treated directly. Such a conclusion is further reinforced in paragraph [0002] where, following the discussion of "metabolic, gastrointestinal, viral, and inflammatory diseases," Haffner *et al.* discusses the "anti-inflammatory effects" of DPP inhibitors. Then, immediately following this discussion, Haffner *et al.* refers to "Korom et al., 1997" which discusses the ability of DPP inihibitors to prolong cardiac transplant survival, an ability that is again based on the inflammatory nature of allograft rejection.

When viewed in this light, it is apparent that the Examiner's belief that Haffner *et al.* teaches a method for treating congestive heart failure by administering a dipeptidyl peptidase inhibitor is unfounded and, as such, Haffner *et al.* does not teach the step of selecting a subject based a diagnosis of congestive heart failure. Accordingly, the anticipation rejection should be withdrawn..

B. *Haffner et al. does not provide an enabling disclosure with regard to selecting a subject to receive one or more inhibitors of prolyl-specific dipeptidyl peptidase based a diagnosis of congestive heart failure, as recited by the present claims*

As discussed in *Impax Laboratories, Inc. v. Aventis Pharmaceuticals Inc.*, 468 F.3d 1366, 1381-82 (Fed. Cir. 2006), in order to be anticipating, a prior art reference must be enabling so that the claimed subject matter may be made or used by one skilled in the art. Prior art is not enabling so as to be anticipating if it does not enable a person of ordinary skill in the art to carry out the invention. And enablement is effected only if one of ordinary skill in the art could have combined the publication's description of the invention with his own knowledge to make the claimed invention.

As in any enablement analysis, the factors addressed in addressed in *In re Wands*, 858 F.2d 731 (Fed.Cir.1988) are applied to the allegedly anticipatory reference to determine whether any experimentation required is undue. *See, Elan Pharmaceuticals, Inc. v. Mayo Foundation for Medical Educ. and Research*, 346 F.3d 1051, 1054-55 (Fed. Cir. 2003). When Haffner *et al.* is properly considered in view of the various *Wands* factors, it is apparent that Haffner *et al.* does not enable a person of ordinary skill in the art to carry out the invention as presently claimed. Accordingly, Haffner *et al.* is not properly citable as prior art to the present claims.

(i) The quantity of experimentation necessary

As discussed above, paragraph [0028] of Haffner *et al.* refers to "a method for the treatment or prophylaxis of metabolic disorders, gastrointestinal disorders, viral disorders, inflammatory disorders, diabetes, obesity, hyperlipidemia, dermatological or mucous membrane disorders, psoriasis, intestinal distress, constipation, autoimmune disorders, encephalomyelitis, complement mediated disorders, glomerulonepritis, lipodystrophy, tissue damage, psychosomatic, depressive, and neuropsychiatric disorders, HIV infection, allergies, inflammation, arthritis, transplant rejection, high blood pressure, congestive heart failure, tumors, and stress-induced abortions" (emphasis added). This section refers to treatment or prophylaxis in the alternative, without informing the skilled artisan of which conditions may be treated directly, and which may be addressed indirectly by prophylaxis.

Haffner *et al.* presents an enormous list of diseases, the vast majority of which have no known direct relationship to DPP or to DPP inhibitors. Consider, for example, the two categories underlined in the preceding paragraph: viral disorders and tumors. A list of human viral disorders compiled by the American Society for Microbiology (a copy of which is provided in an appendix of this submission) continues for some 20 pages of text; and a list of human cancers (and so only a subset of the list of human tumors) compiled by the National Cancer Institute (a copy of which is provided in an appendix of this submission) includes 210 entries, albeit including some duplications.

The present claims include a step of selecting a subject for treatment based upon a specific diagnosis; in this case, congestive heart failure. Based on the knowledge available in the art (generally summarized in the Background of the Invention section of Haffner *et al.*), the skilled artisan is aware that DPP inhibitors have some anti-inflammatory effects, and that DPP inhibitors have been used to treat metabolic diseases such as diabetes. For inflammatory and metabolic disease types, the quantity of experimentation required might be considered to be large, but routine in nature. One would simply rely upon the guidance available in the art to direct the research required to determine whether a DPP inhibitor could be used and, if so, what amount might be useful therapeutically.

It may be possible therefore that the skilled artisan, upon reading Haffner *et al.*, would consider congestive heart failure to be a condition that may be addressed prophylactically, for

example by addressing the upstream "inflammatory disease" that may one day lead to congestive heart failure.

But as far as those members of Haffner *et al.*'s laundry list of conditions that are not inflammatory or metabolic in nature, the skilled artisan would find no suggestion that any particular disease might be treated directly (and hence used as a basis to select subjects for treatment). Any suggestion to the contrary would be considered by the artisan to be nothing more than conjecture unsupported by any scientific reasoning.

Thus, for the skilled artisan to determine which, if any, of the myriad non-inflammatory and non-metabolic conditions presented in Haffner *et al.* could potentially be used to select subjects for treatment, the skilled artisan must embark on a research program in which each possible disease is considered in turn, with the mere hope of being successful. One would not simply focus on congestive heart failure in this regard, as there is no basis provided in Haffner *et al.* for selecting a subject on the basis of any particular disease that is not inflammatory or metabolic in nature. The quantity of experimentation would be considered to be both large and unguided.

(ii) the amount of direction or guidance presented

As noted above, the Background of the Invention section of Haffner *et al.* does provide some guidance to the effect that DPP inhibitors have some anti-inflammatory effects, and that DPP inhibitors have been used to treat metabolic diseases such as diabetes. The skilled artisan understands, however, that congestive heart failure is not itself a metabolic or inflammatory disease. No guidance is provided by Haffner *et al.* for selecting subjects on the basis of a diagnosis of any particular disease that is not inflammatory or metabolic in nature.

(iii) the presence or absence of working examples

Haffner *et al.* provides no examples in which congestive heart failure is addressed, either therapeutically, or indeed even prophylactically.

(iv) the nature of the invention

The nature of the claimed invention is the delivery of therapeutic preparations, specifically DPP inhibitors, to subjects based on a particular disease diagnosis, specifically congestive heart failure.

(v) the state of the prior art

Any direct relationship of prolyl-specific DPP to congestive heart failure, or the use of prolyl-specific DPP inhibitors as therapy in subjects diagnosed as having congestive heart failure, was not described in the prior art. As discussed above, the skilled artisan does understand that the body's response to myocardial infarction, which often causes the "myocardial muscle dysfunction or loss" that lies at the root of future congestive heart failure, does involve inflammation. Thus, the prior art might provide some suggestion for the prophylactic use of DPP-IV inhibitors in congestive heart failure, as DPP-IV is "involved" to the extent that it is implicated in a precursor to the disease.

As Applicant discussed in a previous office action response, increasing natriuretic peptide levels had been found to provide therapeutic benefit to heart failure patients. NATRECOR® (human recombinant BNP) was approved by the U.S. FDA in 2001 for the intravenous treatment of patients with acutely decompensated congestive heart failure.

Neutral endopeptidase ("NEP") has been considered to be a key degradation mediator of BNP, and inhibitors of NEP enzymatic activity have also found use in treating patients with heart failure. Moreover, a combination treatment with both BNP and NEP inhibitors has been reported to produce a synergistic effect on cardiac output, reduced vascular resistance, and unloading of the heart.

Human BNP, however, had been reported to be unusually resistant to NEP degradation. *See, e.g.*, Smith *et al.*, "Delayed metabolism of human brain natriuretic peptide reflects resistance to neutral endopeptidase," *J. Endocrinol.* 167:239-46 (2000). This resistance led those in the art to question the role of neutral endopeptidase inhibition (*e.g.*, Smith *et al.*, page 245, last sentence) in the treatment of heart failure. However, even after the filing date of the present invention, the identity of an alternative degradative pathway for BNP, while actively sought within the art, remained unknown. And certainly, there was no suggestion in the prior art that prolyl-specific DPP was involved in this metabolism. *See, e.g.*, Walther *et al.*, "Biochemical

analysis of neutral endopeptidase activity reveals independent catabolism of atrial and brain natriuretic peptide," *Biol. Chem.* 385: 179-184 (2004):

> [O]ur data clearly indicate one or more other ANP- and BNP-degrading peptidases different from NEP at least in the heart, lungs, and kidneys. The nature of these peptidases is unknown until now, but they should not belong to the aminopeptidases and not be ACE, because bestatin and lisinopril did not influence NP [natriuretic peptide] degradation.

(vi) the relative skill of those in the art

The general level of skill in the art with regard to the use of DPP inhibitors in the treatment of metabolic diseases is high. As indicated by Applicant previously, a large number of such molecules are in clinical trials, with one (Januvia) approved by the U.S. FDA for glycemic control in type 2 diabetes.

(vii) the predictability or unpredictability of the art

Because of the general understanding summarized concerning the anti-inflammatory effects of DPP inhibitors and the use of DPP inhibitors to treat metabolic diseases such as diabetes, there might be some plausible predictability with regard to diseases that are inflammatory or metabolic in nature. The use of prolyl-specific DPP inhibitors as therapy in subjects diagnosed as having other types of diseases, including congestive heart failure, was unpredictable prior to Applicant's invention, as no reasoned scientific basis for such uses could be gleaned from the art. For the skilled artisan to determine which, if any, of the myriad conditions recited in Haffner *et al.* could potentially be used as a basis to select subjects for treatment, the skilled artisan must embark on a research program in which each possible disease is considered in turn with no scientific basis on which to predict success.

(viii) the breadth of the claims

The breadth of conditions recited in Haffner *et al.* can best be described as covering the substantial entirety of human medical conditions. In stark contrast, the present claims are directed to the delivery of DPP inhibitors to subjects based on a particular diagnosis, specifically congestive heart failure.

(ix) conclusion

The present claims include a step of selecting a subject for treatment based upon a specific diagnosis; that is, congestive heart failure. Haffner *et al.* presents a large "wish list" of conditions, stating that these conditions might be suitable for treatment or prophylaxis. Given a general knowledge of the anti-inflammatory properties of DPP inhibitors, it may be possible that the skilled artisan, upon reading Haffner *et al.*, would consider congestive heart failure to be a condition that might be addressed prophylactically, for example by addressing the upstream "inflammatory disease" that might one day result in congestive heart failure, without undue experimentation.

But that same skilled artisan considering conditions that are not inflammatory or metabolic in nature is faced with Haffner *et al.*'s list that can best be described as covering the substantial entirety of human medical conditions. In the absence of any working examples or reasoned scientific basis for considering DPP inhibitors to be directly useful in such conditions, the skilled artisan must address each and every condition hoping to identify those that could be directly treated with DPP inhibitors. Rather than an enabling disclosure, Haffner *et al.* would represent nothing more than an invitation to experiment. Determining which, if any, of these conditions could be used in order to select subjects for delivery of DPP inhibitors would require undue experimentation in the form of a *de novo* clinical research program.

As such, while it might be argued that Haffner *et al.* is enabled for selecting subjects for delivery of prolyl-specific DPP inhibitors on the basis of a diagnosis of an inflammatory disease, it cannot reasonably be stated that this reference is enabled with regard to the present claims that require selection of subjects on the basis of a diagnosis of congestive heart failure. Accordingly, the anticipation rejection should be withdrawn because Haffner *et al.* is not properly citable as prior art to the present claims.

C. *The present invention is novel and distinct from the methods disclosed in Haffner et al.*

As Applicant discussed in a previous office action response, the present invention lies in Applicant's identification of a new use of prolyl-specific DPP inhibitors. Specifically, because natriuretic peptides such as B-type natriuretic peptide ("BNP") are substrates for hydrolysis by prolyl-specific DPPs, DPP inhibitors may be used as a direct treatment of ongoing congestive

heart failure. In this sense, the present invention is distinct from the teachings of Haffner *et al.*, which, as discussed in detail above, at best discusses congestive heart failure as a condition that may be addressed prophylactically by addressing the upstream "inflammatory disease" that may one day lead to congestive heart failure.

The present invention solves, at least in part, the search for alternative degradative pathways for natriuretic peptides in humans. As described in paragraph [0046], natriuretic peptides, and BNP specifically, represent suitable substrates for prolyl-specific DPPs. Pharmaceutically acceptable amounts of the various prolyl-specific DPP inhibitors known in the art, including those described in paragraphs [0126] and [0127] of the specification, may be used to inhibit this previously unknown degradative pathway for natriuretic peptides. And because of the relationship of natriuretic peptides, and BNP specifically, to heart failure, subjects may be selected for administration of prolyl-specific DPP inhibitors based on a diagnosis of congestive heart failure.

In view of the foregoing, Applicant respectfully submits that no *prima facie* case of anticipation has been established, and urges the Examiner to withdraw the anticipation rejection of claims 29, 32, and 43.

2. Rejection of claims 30 and 44 under 35 U.S.C. § 103

Applicant respectfully traverses the rejection of claims 30 and 44 under 35 U.S.C. § 103(a) as being obvious in view of Haffner *et al.* in view of De Meester *et al., Biochem. Pharmacol.* 54: 173-79, 1997.

The deficiencies in the Haffner *et al.* publication are described in detail above, and are not repeated here. De Meester *et al.* is cited solely for the disclosure of a DPP inhibitor comprising a phophonate moiety. As such, De Meester *et al.* does not cure the deficiencies in the primary Haffner *et al.* publication. Haffner *et al.* and De Meester *et al.*, whether considered alone or in combination, fail to teach or suggest the step of selecting subjects for administration of prolyl-specific DPP inhibitors based on a diagnosis of congestive heart failure.

Applicant respectfully submits that no *prima facie* case of obviousness has been established, and urges the Examiner to withdraw the anticipation rejection of claims 30 and 44.

3. Rejection of claims 31 and 45 under 35 U.S.C. § 103

Applicant respectfully traverses the rejection of claims 30 and 44 under 35 U.S.C. § 103(a) as being obvious in view of Haffner *et al.* in view of Bergmann *et al.*, U.S. Patent 6,756,483.

The deficiencies in the Haffner *et al.* publication are described in detail above, and are not repeated here. Bergmann *et al.* is cited solely for the disclosure of a DPP inhibitor comprising an antibody or antibody fragment. As such, Bergmann *et al.* does not cure the deficiencies in the primary Haffner *et al.* publication. Haffner *et al.* and Bergmann *et al.*, whether considered alone or in combination, fail to teach or suggest the step of selecting subjects for administration of prolyl-specific DPP inhibitors based on a diagnosis of congestive heart failure.

Applicant respectfully submits that no *prima facie* case of obviousness has been established, and urge the Examiner to withdraw the anticipation rejection of claims 31 and 45.

4. Rejection of claims 33 and 46 under 35 U.S.C. § 103

Applicant respectfully traverses the rejection of claims 30 and 44 under 35 U.S.C. § 103(a) as being obvious in view of Haffner *et al.* in view of Mills *et al.*, J. Am. Coll. Cardiol. 34: 155-62, 1999.

The deficiencies in the Haffner *et al.* publication are described in detail above, and are not repeated here. Mills *et al.* is cited solely for the disclosure that human recombinant B-type natriuretic peptide is used therapeutically in congestive heart failure. As such, Mills *et al.* does not cure the deficiencies in the primary Haffner *et al.* publication. Haffner *et al.* and Mills *et al.*, whether considered alone or in combination, fail to teach or suggest the step of selecting subjects for administration of prolyl-specific DPP inhibitors based on a diagnosis of congestive heart failure.

Applicant respectfully submits that no *prima facie* case of obviousness has been established, and urge the Examiner to withdraw the anticipation rejection of claims 33 and 46.

CONCLUSION

Applicant respectfully submits that the pending claims are in condition for allowance. An

early notice to that effect is earnestly solicited. Should any matters remain outstanding, the Examiner is encouraged to contact the undersigned at the address and telephone number listed below so that they may be resolved without the need for additional action and response thereto.

Respectfully submitted,

Date 05/24/2007

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ICTVdB Index of Viruses

TAXONOMY AND CLASSIFICATION OF VIRUSES

Cornelia Büchen-Osmond (2006)

MANUAL OF CLINICAL MICROBIOLOGY

8th edition American Society for Microbiology

Human diseases caused by viruses

The list of viruses and their disease designation presented here is based on version 10 of the International Code of Diseases (ICD-10) was too extensive to be published in full length the chapter on *Taxonomy and Classification of Viruses*. The complete list (Table 7) is displayed below and will be updated periodically.

ICD-10 has different special edition in Australia; Canada; New Zealand; USA.
ICD-10 exists also in other than English versions.

ICD-9, ICD-10 files are available online from CDC and can be downloaded here.

Table 7: Reconciliation of comprehensive, current taxonomy from ICTVdB with transmission, symptom and disease designation from ICD-10 and important fact sheets of diseases on the web.

Gemone	Vcode/description	Virus name/Taxonomic list	Acronym	transmission	signs and symptoms	ICD-1(code
dsDNA	00.058.	*Poxviridae*				
dsDNA	00.058.1.	*Chordopoxvirinae*				
dsDNA	00.058.1.01.	*Orthopoxvirus*				
dsDNA	00.058.1.01.004.	*Cowpoxvirus*	(CPXV)	direct contact with wound,	skin and mucous membrane lesions	B08.0

dsDNA	00.058.1.01.006.	*Monkeypox virus*	(MPXV)	abrasions, aerosol, fomites		B04
dsDNA	00.058.1.01.010.	*Vaccinia virus*	(VACV)		skin and mucous membrane lesions	B08.0
dsDNA	00.058.1.01.011.	*Variola virus*	(VARV)		eradicated since 1980	B03
dsDNA	00.058.1.02.	*Parapoxvirus*				
dsDNA	00.058.1.02.002.	*Bovine papular stomatitis virus*	(BPSV)	direct contact	skin and mucous membrane lesions	B08.0
dsDNA	00.058.1.02.003.	*Orf virus*	(ORFV)	direct contact	contagious ecthyma	B08.0
dsDNA	00.058.1.02.005.	*Pseudocowpox virus*	(PCPV)	direct contact	skin and mucous membrane lesions	B08.0
dsDNA	00.058.1.07.	*Molluscipoxvirus*				
dsDNA	00.058.1.07.001.	*Molluscum contagiosum virus*	(MOCV)	direct contact with wound,	eczema, contagious pustular dermatitis	B08.1
dsDNA				abrasions, aerosol,		
dsDNA				often sexually transmitted		
dsDNA	00.058.1.08.	*Yatapoxvirus*				
dsDNA	00.058.1.08.002.	*Tanapox virus*	(TANV)	direct contact	skin and mucous membrane lesions	B08.8
dsDNA	00.058.1.08.003.	*Yaba monkey tumor virus*	(YMYV)	direct contact	skin and mucous membrane lesions	B08.8
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-1(code**
dsDNA	00.031.	*Herpesviridae*				
dsDNA	00.031.1.	*Alphaherpesvirinae*				
dsDNA	00.031.1.01.	*Simplexvirus*				
dsDNA	00.031.1.01.001.	*Human herpesvirus 1*	(HHV-1)	direct contact,	oral infections, ulceration of	B00.0
dsDNA		(Herpes simplex virus 1)		sexual transmission,	cornea, herpetic encephalitis	B00.1
dsDNA				persistent infection,		B00.2
dsDNA				acute and latent stages		B00.3 (G02.0
dsDNA						B00.4 (G05.1
dsDNA						B00.5
dsDNA						B00.7
dsDNA						B00.8
dsDNA						B00.9

dsDNA	00.031.1.01.004.	*Human herpesvirus 2*	(HHV-2)	direct contact	genital tract infections, meningitis;	A60. (N51.1) (N77.0, N77.1)
dsDNA		(Herpes simplex virus 2)		sexual transmission	encephalitis, dissemination	A60.0
dsDNA				persistent infection, acute and latent stages		A60.1
dsDNA						A60.9
dsDNA						B00.3 (G02.0)
dsDNA						B00.4 (G05.1)
dsDNA						B00.8 (K77.0)
dsDNA	00.031.1.02.	*Varicellovirus*				
dsDNA	00.031.1.02.001.	*Human herpesvirus 3*	(HHV-3)	direct contact	chickenpox, meningitis;	B01.0 (G02.0)
dsDNA		(Varicella-zoster virus)		air-borne route	encephalitis, pneumonia	B01.1 (G05.1)
dsDNA				acute primary infection		B01.2 (J17.1)
dsDNA						B01.8
dsDNA						B01.9
dsDNA	00.031.1.02.015.	*Human herpesvirus 3*	(HHV-3)	direct contact	zoster; shingles, meningitis;	B02.0 (G05.1)
dsDNA		(Varicella-zoster virus)		air-borne route	encephalitis	B02.1 (G02.0)
dsDNA				recurrent infection		B02.2
dsDNA						B02.3
dsDNA						B02.7
dsDNA						B02.8
dsDNA						B02.9
dsDNA	00.031.2.	*Betaherpesvirinae*				
dsDNA	00.031.2.01.	*Cytomegalovirus*				
dsDNA	00.031.2.01.001.	*Human herpesvirus 5*	(HHV-5)	direct contact	cytomegaloviral mononucleosis,	B25.0 (J17.1)

dsDNA		(Human cytomegalovirus)		air-borne route	infectious mononucleosis	B25.1 (K77.0)
dsDNA						B25.2 (K87.1)
dsDNA						B25.8
dsDNA						B25.9
dsDNA						B27.0
dsDNA						B27.1
dsDNA	00.031.2.03.	*Roseolovirus*				
dsDNA	00.031.2.03.001.	*Human herpesvirus 6*	(HHV-6)	direct contact	Roseola infantum, exanthema	B08.2
dsDNA				air-borne route	subitum, sixth disease,	B08.2
dsDNA					3 day fever exanthema	B08.2
dsDNA	00.031.2.03.002.	*Human herpesvirus 7*	(HHV-7)	direct contact		B08.2
dsDNA				air-borne route		B08.2
dsDNA	00.031.3.	*Gammaherpesvirinae*				
dsDNA	00.031.3.01.	*Lymphocryptovirus*				
dsDNA	00.031.3.01.001.	*Human herpesvirus 4*	(HHV-4)	usually via saliva, blood	Epstein-Barr virus, infectious	B27.0 (J12.8)
dsDNA		(Epstein-Barr virus)		transfusion (rarely)	mononucleosis (kissing disease) Hodgkin's disease (?)	C83.7
dsDNA					Hodgkin's disease (?)	
dsDNA	00.031.3.02.	*Rhadinovirus*				
dsDNA	00.031.3.02.011.	*Human herpesvirus 8*	(HHV-8)	direct contact	Kaposi's sarcoma;	B00.0
dsDNA		(Kaposi's sarcoma-associated herpesvirus)			eczema herpaticum, sarcoma	C46.9
dsDNA						B21.0
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-10 code**
dsDNA	00.001.	*Adenoviridae*		[Wadell, 1999 #36]		
dsDNA	00.001.0.01.	*Mastadenovirus*				
dsDNA	00.001.0.01.008.	*Human adenovirus A*	(HAdV-A)	respiratory route	cryptic enteric infection	B34.0
dsDNA					serotypes 12, 18, 31	
dsDNA	00.001.0.01.009.	*Human adenovirus B*	(HAdV-B)	respiratory and fecal-oral route	respiratory disease, persistent infection of the kidney	B34.0
dsDNA					serotypes B1: 3, 7, 11, 16, 21	J12.0
dsDNA					serotypes B2: 14, 34, 35, 50	A85.1 (G05.1)

dsDNA						A87.1 (G02.0
dsDNA	00.001.0.01.010.	*Human adenovirus C*	(HAdV-C)	respiratory route and fecal-oral route	lower respiratory tract infection; pharyngeal conjunctivitis, diarrhea	B34.0
dsDNA					serotypes 1, 2, 5, 6, 13	A08.2
dsDNA						A08.4
dsDNA	00.001.0.01.011.	*Human adenovirus D*	(HAdV-D)	direct contact	keratoconjunctivitis	B34.0
dsDNA				air-borne route	serotypes 8-10, 13, 15, 17 19-20, 22-33, 36-49, 51	B30.0 (H19.2
dsDNA					scarring caused by 8, 19 an 37	
dsDNA	00.001.0.01.012.	*Human adenovirus E*	(HAdV-E)	fecal-oral route, (swimming	conjunctivitis, respiratory disease	B34.0
dsDNA				pools), air-borne route	serotypes 4, 22-25	J12.0
dsDNA						B30.1 (H13.1
dsDNA	00.001.0.01.013.	*Human adenovirus F*	(HAdV-F)	fecal-oral route	infantile diarrhea	B34.0
dsDNA					serotypes 40-41	A08.2
dsDNA						A08.4
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-1(code**
dsDNA	00.047.	*Polyomaomaviridae*				
dsDNA	00.047.0.01.	*Polyomavirus*				B34.4
dsDNA	00.047.0.01.004.	*BK polyomavirus*	(BKPyV)	contaminated food or water (?); respiratory spread	nephropathy	B97.8 (N30; N05)
dsDNA	00.047.0.01.014.	*Human polyomavirus*	(HPyV)	contaminated food or water (?)	nephropathy in transplant patients	B97.8
dsDNA	00.047.0.01.008.	*JC polyomavirus*	(JVPyV)	contaminated food or water (?)	latent in the lymphocytes, urogenital tract, brain	B97.8 (A81.2
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-1(code**
dsDNA	00.099.	*Papillomaviridae*				
dsDNA	00.099.0.02.	*Alphapapillomavirus*				B34.4
dsDNA	00.099.0.02.004.	*Human papillomavirus 2*	(HPV-2)		oral and anogenital mucosa,	B97.7 (D26.1

dsDNA	00.099.0.02.002.	*Human papillomavirus 10*	(HPV-10)	lesions of coutanous sites	B97.7 (D14.1
dsDNA	00.099.0.02.010.	*Human papillomavirus 6*	(HPV-6)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.02.008.	*Human papillomavirus 7*	(HPV-7)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.02.009.	*Human papillomavirus 16*	(HPV-16)	malignant tissue,	B97.7 (D14.1
dsDNA	00.099.0.02.007.	*Human papillomavirus 18*	(HPV-18)	in vitro transforming activities	B97.7 (D14.1
dsDNA	00.099.0.02.005.	*Human papillomavirus 26*	(HPV-26)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.02.001.	*Human papillomavirus 32*	(HPV-32)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.02.011.	*Human papillomavirus 34*	(HPV-34)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.02.006.	*Human papillomavirus 53*	(HPV-53)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.02.013.	*Human papillomavirus 54*	(HPV-54)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.02.003.	*Human papillomavirus 61*	(HPV-61)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.02.015.	*Human papillomavirus 71*	(HPV-71)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.02.014.	*Human papillomavirus cand90*	(HPV-cand90)	oral and anogenital mucosa	B97.7 (D14.1
dsDNA	00.099.0.03.	*Betapapillomavirus*			B34.4
dsDNA	00.099.0.03.001.	*Human papillomavirus 5*	(HPV-5)	epidermodysplasia veruciformis	B07
dsDNA	00.099.0.03.002.	*Human papillomavirus 9*	(HPV-9)	epidermodysplasia veruciformis	B07
dsDNA	00.099.0.03.003.	*Human papillomavirus 49*	(HPV-49)	epidermodysplasia veruciformis	B07
dsDNA	00.099.0.03.004.	*Human papillomavirus cand92*	(HPV-cand92)	viral warts, papilloma	B97.7 (D14.1
dsDNA	00.099.0.03.005.	*Human papillomavirus cand96*	(HPV-cand96)	viral warts, papilloma	B97.7 (D14.1
dsDNA	00.099.0.04.	*Gammapapillomavirus*			B34.4
dsDNA	00.099.0.04.001.	*Human papillomavirus 4*	(HPV-4)	cutaneous lesions with	B97.7 (D14.1
dsDNA	00.099.0.04.002.	*Human papillomavirus 48*	(HPV-48)	intracytoplasmic inclusion bodies	B97.7 (D14.1

dsDNA	00.099.0.04.003.	*Human papillomavirus 50*	(HPV-50)			B97.7 (D14.1
dsDNA	00.099.0.04.004.	*Human papillomavirus 60*	(HPV-60)			B97.7 (D14.1
dsDNA	00.099.0.04.005.	*Human papillomavirus 88*	(HPV-88)			B97.7 (D14.1
dsDNA	00.099.0.13.	*Mupapillomavirus*				
dsDNA	00.099.0.13.001.	*Human papillomavirus 1*	(HPV-1)		cutaneous lesions with	B97.7 (D14.1
dsDNA	00.099.0.13.002.	*Human papillomavirus 63*	(HPV-63)		intracytoplasmic inclusion bodies	B97.7 (D14.1
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-1(code**
ssDNA	00.050.	*Parvoviridae*				
ssDNA	00.050.1.	*Parvovirinae*				B34.3
ssDNA	00.050.1.02.	*Erythrovirus*				
ssDNA	00.050.1.02.001.	*B19 virus*	(B19V)		exanthema in children, haemolytic crisis in people with sickle cell disease	B06.9
ssDNA						B08.3
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-1(code**
dsDNA-RT	00.030.	*Hepadnaviridae*				
dsDNA-RT	00.030.0.01.	*Orthohepadnavirus*				B B16
dsDNA-RT	00.030.0.01.003.	*Hepatitis B virus*	(HBV)	direct transmission, injection	acute hepatitis which may progress to chronic hepatitis, liver cirrhosis and primary hepatocellular carcinoma	B16.0
dsDNA-RT				fecal / oral route	superinfection with Deltavirus possible	B16.1
dsDNA-RT				close contact (including sexual)		B16.2
dsDNA-RT						B16.9
dsDNA-RT						B18.0
dsDNA-RT						B18.1
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-1(code**
ssRNA_RT	00.061.	*Retroviridae*				
ssRNA_RT	00.061.0.05.	*Orthoretrovirinae*				B33.3

ssRNA_RT	00.061.1.05.	*Deltaretrovirus*				B33.3
ssRNA_RT						B97.3
ssRNA_RT	00.061.1.05.002.	*Primate T-lymphotropic virus 1*	(HTLV-1)		opportunistic infection	Z22.6
ssRNA_RT	00.061.1.05.003.	*Primate T-lymphotropic virus 2*	(HTLV-2)			
ssRNA_RT	00.061.1.06.	*Lentivirus*				B24
ssRNA_RT	00.061.1.06.009.	*Human immunodeficiency virus 1*	(HIV-1)	horizontal and vertical transmission	AIDS	B23.0
ssRNA_RT				close contact (including sexual), injection	immune deficiency syndrome,	B20
ssRNA_RT					and selected resulting diseases:	B21
ssRNA_RT					slim disease,	B22
ssRNA_RT					encephalopathy;	
ssRNA_RT					persistent lymphopathy	
ssRNA_RT	00.061.1.06.010.	*Human immunodeficiency virus 2*	(HIV-2)	close contact (including sexual), injection	AIDS	B23.0
ssRNA_RT					immune deficiency syndrome	B24
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-10 code**
dsRNA	00.060.	*Reoviridae*				
dsRNA	00.060.0.01.	*Orthoreovirus*				
dsRNA	00.060.0.01.004.	*Mammalian orthoreovirus*	(MRV)	respiratory route	generally benign, may cause upper respiratory tract illness or enteritis in infants and children	B97.5
dsRNA				enteric route		
dsRNA	00.060.0.02.	*Orbivirus*				
dsRNA	00.060.0.02.002.	*African horse sickness virus*	(AHSV)	arthropod-borne:	may infect humans under special circumstances	B97.5
dsRNA				Culicoides		
dsRNA	00.060.0.02.004.	*Changuinola virus*	(SRAV)	phlebotomines, culicine mosquitos	may infect humans	B97.5
dsRNA	00.060.0.02.007.	*Corriparta virus*	(CORV)	culicine mosquitos	may infect humans	B97.5
dsRNA	00.060.0.02.014.	*Orungo virus*	(ORUV)	culicine mosquitos	may infect humans	B97.5

dsRNA	00.060.0.03.	*Rotavirus*				
dsRNA	00.060.0.03.001.	*Rotavirus A*	(RV-A)	enteric route	enteritis, gastroenteritis	A08.0
dsRNA					watery diarrhea in infants	A08.0
dsRNA	00.060.0.03.002.	*Rotavirus B*	(RV-B)	enteric route	enteritis, gastroenteritis	A08.0
dsRNA					may cause epidemics	A08.0
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-10 code**
neg ssRNA	01.	*Mononegavirales*				
neg ssRNA	01.025.	*Filoviridae*		Biosafety Level 4		
neg ssRNA	01.025.0.01.	*Marburgvirus*				
neg ssRNA	01.025.0.01.001.	*Lake Victoria marburgvirus*	(MARV)	direct contact with blood of body fluids;	hemorrhagic fever	A98.3
neg ssRNA				droplet and aerosol infection may occur		
neg ssRNA	01.025.0.02.	*Ebolvirus*		as above		
neg ssRNA	01.025.0.02.005.	*Ivory Coast ebolavirus*	(CIEBOV)	direct contact	hemorrhagic fever	A98.4
neg ssRNA	01.025.0.02.002.	*Reston ebolavirus*	(REBOV)	direct contact	hemorrhagic fever	A98.4
neg ssRNA	01.025.0.02.003.	*Sudan ebolavirus*	(SEBOV)	direct contact	hemorrhagic fever	A98.4
neg ssRNA	01.025.0.02.004.	*Zaire ebolavirus*	(ZEBOV)	direct contact	hemorrhagic fever	A98.4
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-10 code**
neg ssRNA	01.048.	*Paramyxoviridae*				B34.8
neg ssRNA	01.048.1.	*Paramyxovirinae*				
neg ssRNA	01.048.1.01.	*Respirovirus*				
neg ssRNA	01.048.1.01.003.	*Human parainfluenza virus 1*	(HPIV-1)	mainly droplets and aerosol transmission	respiratory tract infection; pneumonia	J12.2
neg ssRNA						J20.4
neg ssRNA	01.048.1.01.004.	*Human parainfluenza virus 3*	(HPIV-3)	mainly droplets and aerosol transmission	respiratory tract infection; pneumonia	J12.2
neg ssRNA						J20.4
neg ssRNA	01.048.1.02.	*Morbillivirus*				
neg ssRNA	01.048.1.02.004.	*Measles virus*		horizontal transmission	measles; persistent infections	B05.8

neg ssRNA		*(Edmonston virus)*		mainly airborne routes	subacute sclerosing panencephalitis	
neg ssRNA						B05.0 (G05.1*
neg ssRNA						B05.1 (G02.0*
neg ssRNA						B05.2 (J17.1*
neg ssRNA						B05.3 (H67.1*
neg ssRNA						B05.4
neg ssRNA						B05.8
neg ssRNA	01.048.1.03.	*Rubulavirus*				
neg ssRNA	01.048.1.03.010.	*Human parainfluenza virus 2*	(HPIV-2)	mainly droplets and aerosol transmission	respiratory tract infection; pneumonia	J12.2
neg ssRNA						J20.4
neg ssRNA	01.048.1.03.011.	*Human parainfluenza virus 4*	(HPIV-4)	mainly droplets and aerosol transmission	respiratory tract infection; pneumonia	J12.2
neg ssRNA						J20.4
neg ssRNA	01.048.1.03.013.	*Mumps virus*	(MuV)	horizontal transmission	mumps; orchitis; meningitis, encephalitis, pancreatitis	B26.9
neg ssRNA				mainly airborne routes		B26.0 (N51.1*
neg ssRNA						B26.1 (G02.0*
neg ssRNA						B26.2 (G05.1*
neg ssRNA						B26.3 (K87.1*
neg ssRNA						B26.8
neg ssRNA	01.048.1.04.	*Henipavirus*				
neg ssRNA	01.048.1.04.001.	*Hendravirus*		natural host: fruit bats; direct contact	hyperacute respiratory disease	
neg ssRNA	01.048.1.04.002.	*Nipahvirus*		natural host: pigs ?; direct contact	respiratory illness	

neg ssRNA					febrile encephalitis	
neg ssRNA	01.048.2.	*Pneumovirinae*				
neg ssRNA	01.048.2.01.	*Pneumovirus*				
neg ssRNA	01.048.2.01.003.	*Human respiratory syncytial virus*	(HRSV)		pneumonia, bronchitis	J12.1
neg ssRNA						J20.5
neg ssRNA						J21.0
neg ssRNA	01.048.2.02.	*Metapneumovirus*				
neg ssRNA	01.048.2.02.003.	*Human metapneumovirus*	(HMPV)		pneumonia, bronchitis	J12.2
neg ssRNA						J20.4
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-10 code**
neg ssRNA	01.062.	*Rhabdoviridae*				
neg ssRNA	01.062.0.01.	*Vesiculovirus*				
neg ssRNA	01.062.0.01.002.	*Chandipura virus*	(CHPV)		fever	A92.8
neg ssRNA	01.062.0.01.003.	*Cocal virus*	(COCV)		fever	A92.9
neg ssRNA	01.062.0.01.004.	*Isfahan virus*	(ISFV)		fever	A92.9
neg ssRNA	01.062.0.01.006.	*Piry virus*	(PIRYV)		fever	A93.8
neg ssRNA	01.062.0.01.007.	*Vesicular stomatitis Alagoas virus*	(VSAV)		fever	A93.8
neg ssRNA	01.062.0.01.008.	*Vesicular stomatitis Indiana virus*	(VSIV)		fever	A93.8
neg ssRNA	01.062.0.01.009.	*Vesicular stomatitis New Jersey virus*	(VSNJV)		fever	A93.8
neg ssRNA	01.062.0.02.	*Lyssavirus*				
neg ssRNA	01.062.0.02.008.	*Australian bat lyssavirus*	(ABLV)	black flying fox (Pteropus alecto)	numbness, weakness	
neg ssRNA				fruit bat bites	coma; encephalitis	
neg ssRNA	01.062.0.02.007.	*Rabies virus*	(RABV)	direct contact	rabies	A82.9
neg ssRNA				(dog) bites		A82.0
neg ssRNA						A82.1
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-10 code**
neg ssRNA	00.046.	*Orthomyxoviridae*				
neg ssRNA	00.046.0.01.	*Influenzavirus A*				

neg ssRNA	00.046.0.01.001.	*Influenza A virus*	(FLUAV)		recurrent epidemics of respiratory disease; occasional pandemics; (broncho)-pneumonia; avian flu	J10.0
neg ssRNA						J10.1
neg ssRNA						J10.8
neg ssRNA						J11.0
neg ssRNA						J11.1
neg ssRNA						J11.8
neg ssRNA	00.046.0.04.	*Influenzavirus B*				
neg ssRNA	00.046.0.04.001.	*Influenza B virus*	(FLUBV)		recurrent epidemics of respiratory disease	J10.0
neg ssRNA						J10.1
neg ssRNA						J10.8
neg ssRNA						J11.0
neg ssRNA						J11.1
neg ssRNA						J11.8
neg ssRNA	00.046.0.02.	*Influenzavirus C*				
neg ssRNA	00.046.0.02.001.	*Influenza C virus*	(FLUCV)		common cold infection in children	J10.0
neg ssRNA						J10.1
neg ssRNA						J10.8
neg ssRNA						J11.0
neg ssRNA						J11.1
neg ssRNA						J11.8

Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-10 code**
neg ssRNA	00.011.	*Bunyaviridae*				
neg ssRNA	00.011.0.01.	*Bunyavirus*				A92.8
neg ssRNA	00.011.0.01.013.	*Bunyamwera virus*	(BUNV)	arthropod-borne	fever	A92.8
neg ssRNA	00.011.0.01.015.	*Bwamba virus*	(BWAV)	arthropod-borne	fever	A92.8
neg ssRNA	00.011.0.01.016.	*California encephalitis virus*	(CEV)	arthropod-borne	fever, encephalitis: including strains	A83.5
neg ssRNA					La Crosse, Jamestown Canyon, Snowshoe hare and Tahyna virus	
neg ssRNA	00.011.0.01.023.	*Guama virus*	(GMAV)	arthropod-borne	fever	A92.8
neg ssRNA	00.011.0.01.036.	*Oriboca virus*	(ORIV)	arthropod-borne	fever	A93
neg ssRNA	00.011.0.01.037.	*Oropouche virus*	(OROV)	arthropod-borne	fever	A93.0
neg ssRNA	00.011.0.02.	*Hantavirus*		reservoir host: rodent	http://www.cdc.gov/ncidod/diseases/hanta/hps/index.htm	
neg ssRNA	00.011.0.02.002.	*Andes virus*	(ANDV)	South America	pulmonary syndrome	A98.5
neg ssRNA	00.011.0.02.008.	*Hantaan virus*	(HTNV)	South-East Asia	hemorrhagic fever w renal syndrome	A98.5

neg ssRNA	00.011.0.02.015.	*Puumala virus*	(PUUV)	South-East Asia	epidemic nephropathy	A98.5
neg ssRNA	00.011.0.02.018.	*Seoul virus*	(SEOV)	South-East Asia	hemorrhagic fever w renal syndrome	A98.5
neg ssRNA	00.011.0.02.006.	*Dobrava-Belgrade virus*	(DOBV)	South-East Europe	hemorrhagic fever w renal syndrome	A98.5
neg ssRNA	00.011.0.02.003.	*Bayou virus*	(BAYV)	Americas (SE USA)	pulmonary syndrome	A98.5
neg ssRNA	00.011.0.02.004.	*Black Creek Canal virus*	(BCCV)	Americas (SE USA)	pulmonary syndrome	A98.5
neg ssRNA	00.011.0.02.013.	*New York virus*	(NYV)	Americas (N.Y.)	pulmonary syndrome	A98.5
neg ssRNA	00.011.0.02.019.	*Sin Nombre virus*	(SNV)	Americas (SW USA)	acute respiratory distress syndrome	A98.5
neg ssRNA	00.011.0.03.	*Nairovirus*				
neg ssRNA	00.011.0.03.002.	*Crimean-Congo hemorrhagic fever virus*	(CCHFV)	arthropod-born	hemorrhagic fever	A98.0
neg ssRNA	00.011.0.03.004.00.009.	Nairobi sheep disease virus	(NSDV)	arthropod-born	fever	A93.8
neg ssRNA	00.011.0.04.	*Phlebovirus*				
neg ssRNA	00.011.0.04.007.	*Rift Valley fever virus*	(RVFV)	arthropod-born	acute fever	A92.4
neg ssRNA	00.011.0.04.009.	*Sandfly fever Naples virus*	(SFNV)	arthropod-born	fever	A93.1
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-10 code**
neg ssRNA	00.003.	*Arenaviridae*				
neg ssRNA	00.003.0.01.	*Arenavirus*				
neg ssRNA						
neg ssRNA						
neg ssRNA	00.003.0.01.003.	*Lassa virus*	(LASV)	reservoir host: rodent	old world: hemorrhagic fever,	A96.2
neg ssRNA	00.003.0.01.004.	*Lymphocytic choriomeningitis virus*	(LCMV)	reservoir host: rodent	old world: meningitis, encephalitis	A96.2
neg ssRNA	00.003.0.01.009.	*Guanarito virus*	(GTOV)	reservoir host: rodent	Venezuelan hemorrhagic fever	A96.8
neg ssRNA	00.003.0.01.010.	*Junín virus*	(JUNV)	reservoir host: rodent	Argentine hemorrhagic fever	A96.0
neg ssRNA	00.003.0.01.012.	*Machupo virus*	(MACV)	reservoir host: rodent	Bolivian hemorrhagic fever	A96.1
neg ssRNA	00.003.0.01.017.	*Sabiá virus*	(SABV)	reservoir host: rodent	Brazil: hemorrhagic fever	A96.8

Gemone	Vcode/description	Virus name/Taxonomic list	Acronym	transmission	signs and symptoms	ICD-10 code
neg ssRNA	82.022.	*unassigned*				
neg ssRNA	82.022.0.01.	*Deltavirus*				
neg ssRNA	82.022.0.01.001.	*Hepatitis delta virus*		fecal-oral route, transfusion, injection	acute and chronic hepatitis	B16.0
neg ssRNA						B16.1
neg ssRNA						B17.0
neg ssRNA						B18.0
neg ssRNA						

Gemone	Vcode/description	Virus name/Taxonomic list	Acronym	transmission	signs and symptoms	ICD-10 code
pos ssRNA	03.	*Nidovirales*				
pos ssRNA	03.019.	*Coronaviridae*				
pos ssRNA	03.019.0.01.	*Coronavirus*				
pos ssRNA	03.019.0.01.005.	*Human coronavirus 229E*	(HCoV-229E)	respiratory, fecal-oral route; ubiquitous	common cold symptoms, gastrointestinal infections	B34.2
pos ssRNA	03.019.0.01.006.	*Human coronavirus OC43*	(HCoV-OC43)	respiratory, fecal-oral route; ubiquitous	common cold symptoms, gastrointestinal infections	B34.2
pos ssRNA	03.019.0.01.015.	*Human enteric coronavirus*	(HECoV)	respiratory, fecal-oral route; ubiquitous	common cold symptoms, gastrointestinal infections	B34.2
pos ssRNA	03.019.0.01.014.	*Severe acute respiratory syndrom coronavirus*	(SARSCoV)	respiratory, fecal-oral route	Severe acute respiratory syndrome [SARS]	U04; U04.9
pos ssRNA	03.019.0.02.	*Torovirus*			infects possibly humans	B34.2

Gemone	Vcode/description	Virus name/Taxonomic list	Acronym	transmission	signs and symptoms	ICD-10 code
pos ssRNA	00.052.	*Picornaviridae*				
pos ssRNA	00.052.0.01.	*Enterovirus*				
pos ssRNA	00.052.0.01.003.	*Human enterovirus A*	(HEV-A)	horizontal transmission; mainly by contact, fecal-oral (food-borne) or	diarrhea, vesicular pharyngitis, vesicular stomatitis with exanthema; meningitis, encephalitis,	A08.3

				airborne route		
pos ssRNA					10 serotypes: Human coxsackievirus	B34.1
pos ssRNA					A2-3, A5, A7-8, A10, A12, A14, A16;	B08.4
pos ssRNA					Human enterovirus 71 (hand foot and mouth disease)	B08.5
pos ssRNA						J20.3
pos ssRNA						A85.0 (G05.1
pos ssRNA						B 08.8
pos ssRNA						A87.0 (G02.0
pos ssRNA	00.052.0.01.004.	*Human enterovirus B*	(HEV-B)	horizontal transmission; mainly by contact, fecal-oral (food-borne) or airborne route	vesicular pharyngitis, vesicular stomatitis with exanthema, bronchitis, meningitis, encephalitis,	B34.1
pos ssRNA					36 serotypes: Human coxsackievirus B1-6, A9;	A87.0 (G02.0
pos ssRNA					Human echovirus 1-7, 9, 11-21; 24-27, 29-33;	B08.4
pos ssRNA					Human enterovirus 69	B08.5
pos ssRNA						J20.3
pos ssRNA						A85.0 (G05.1
pos ssRNA						J20.7
pos ssRNA	00.052.0.01.005.	*Human enterovirus C*	(HEV-C)	horizontal transmission; mainly by contact, fecal-oral (food-borne) or airborne route	vesicular pharyngitis, vesicular stomatitis with exanthema, conjunctivitis; bronchitis, encephalitis, meningitis, myocarditis	B34.1
pos ssRNA					11 serotypes: Human coxsackievirus	B08.4
pos ssRNA					A1, A11, A13, A15, A17-22,	B08.5
pos ssRNA						J20.3
pos ssRNA						A87.0 (G02.0
pos ssRNA						B33.2

pos ssRNA					Human coxsackievirus A24	B30.3 (H13.1)
pos ssRNA	00.052.0.01.006.	*Human enterovirus D*	(HEV-D)	horizontal transmission; mainly by contact, fecal-oral (food-borne) or airborne route	diarrhea, vesicular pharyngitis, vesicular stomatitis with exanthema, encephalitis, meningitis, conjunctivitis	B34.1
pos ssRNA					Human enterovirus 68, 70	B20.7
pos ssRNA						A85.0 (G05.1)
pos ssRNA						A87.0 (G02.0)
pos ssRNA					Human enterovirus 70	B30.3 (H13.1)
pos ssRNA	00.052.0.01.007.	*Poliovirus*	(PV)	horizontal transmission; mainly by contact, fecal-oral (food-borne) or airborne route	encephalitis, meningitis, paralysis	A80.0
pos ssRNA						A80.1
pos ssRNA						A80.2
pos ssRNA						A80.3
pos ssRNA					3 serotypes:	A80.4
pos ssRNA					Human poliovirus 1-3	A80.9
pos ssRNA	00.052.0.02.	*Rhinovirus*				
pos ssRNA	00.052.0.02.001.	*Human rhinovirus A*	(HRV-A)	direct contact, fecal-oral or airborne route	common cold, upper respiratory tract infection, bronchitis	B34.1
pos ssRNA					18 serotypes: Human rhinovirus 1, 2, 7, 9, 11, 15, 16, 21, 29, 36, 39, 49, 50, 58, 62, 65, 85, 89	B34.8
pos ssRNA						B97.1
pos ssRNA						B20.6
pos ssRNA	00.052.0.02.002.	*Human rhinovirus B*	(HRV-B)	direct contact, fecal-oral or airborne route	common cold, upper respiratory tract infection, bronchitis	B34.1
pos ssRNA					3 serotypes: Human rhinovirus 3, 14, 72	B34.8

pos ssRNA						B97.1
pos ssRNA						B20.6
pos ssRNA	00.052.0.03.	*Hepatovirus*				
pos ssRNA	00.052.0.03.001.	*Hepatitis A virus*	(HAV)	direct contact, fecal-oral (food-borne)	hepatitis, diarrhea	B15.0
pos ssRNA					Human hepatitis virus A (HHAV)	B15.1
pos ssRNA	00.052.0.06.	*Parechovirus*				
pos ssRNA	00.052.0.06.001.	*Human parechovirus*	(HPeV)	direct contact, fecal-oral or airborne route	upper respiratory tract infection, bronchitis, meningitis	B34.1
pos ssRNA					formerly Human echovirus 22, 23	B34.8
pos ssRNA						A87.0 (G02.0
pos ssRNA						J20.7

Gemone	Vcode/description	Virus name/Taxonomic list	Acronym	transmission	signs and symptoms	ICD-1(code
pos ssRNA	00.012.	*Caliciviridae*				
pos ssRNA	00.012.0.03.	*Norovirus*				
pos ssRNA	00.012.0.03.001.	*Norwalk virus*	(NV)	direct contact, fecal-oral route	acute gastroenteritis caused by strains: Desert Shield, Lordsdale, Mexico, Norwalk, Hawaii, Snow Mountain, Southampton virus	A08.1
pos ssRNA	00.012.0.04.	*Sapovirus*				
pos ssRNA	00.012.0.04.001.	*Sapporo virus*	(SV)	direct contact, fecal-oral route	acute gastroenteritis caused by strains: Houston/86, Houston/90, London 29845, Manchester, Parkville, Sapporo virus	A08.3

Gemone	Vcode/description	Virus name/Taxonomic list	Acronym	transmission	signs and symptoms	ICD-1(code
pos ssRNA	00.084.	*unassigned*				
pos ssRNA	00.084.0.01.	*Hepevirus*				
pos ssRNA	00.084.0.01.001.	*Hepatitis E virus*	(HEV)	direct contact, fecal-oral route	acute hepatitis	B17.2

Gemone	Vcode/description	Virus name/Taxonomic list	Acronym	transmission	signs and symptoms	ICD-1(code
pos ssRNA	00.005.	*Astroviridae*				
pos ssRNA	00.005.0.01.	*Mamastrovirus*				
pos ssRNA	00.005.0.01.005.	*Human astrovirus*	(HAstV)	fecal-oral route	enteritis; gastroenteritis	A08.3

Gemone	Vcode/description	Virus name/Taxonomic list	Acronym	transmission	signs and symptoms	ICD-10 code
pos ssRNA	00.073.	*Togaviridae*				
pos ssRNA	00.073.0.01.	*Alphavirus*				
pos ssRNA	00.073.0.01.007.	*Chikungunya virus*	(CHIKV)	arthropod-borne;	febrile illness, sever chills arthralgia, leucopoenia and rash	A92.0
pos ssRNA				air-borne		
pos ssRNA	00.073.0.01.019.	*O'nyong-nyong virus*	(ONNV)	arthropod-borne	febrile illness, sever chills arthralgia, leucopoenia and rash	A92.1
pos ssRNA						M01.5
pos ssRNA	00.073.0.01.014.	*Mayaro virus*	(MAYV)	arthropod-borne	febrile illness, sever chills arthralgia, leucopoenia and rash	A92.8
pos ssRNA	00.073.0.01.021.	*Ross River virus*	(RRV)	arthropod-borne	epidemic polyarthritis and exanthema	B33.1
pos ssRNA	00.073.0.01.004.	*Barmah Forest virus*	(BFV)	arthropod-borne	viral polyarthritis and rush	B33.8
pos ssRNA	00.073.0.01.024.	*Sindbis virus*	(SINV)	arthropod-borne	fevers, headaches, general weakness, rash and joint pain	B33.8
pos ssRNA	00.073.0.01.004.00.018.	*Ockelbo virus*		arthropod-borne	fevers, headaches, general weakness, rash and joint pain	B33.8
pos ssRNA	00.073.0.01.026.	*Venezuelan equine encephalitis virus*	(VEEV)	arthropod-borne	severe encephalitis	A92.2
pos ssRNA	00.073.0.01.027.	*Western equine encephalitis virus*	(WEEV)	arthropod-borne	severe encephalitis	A83.1
pos ssRNA	00.073.0.01.008.	*Eastern equine encephalitis virus*	(EEEV)	arthropod-borne	severe encephalitis	A83.2
pos ssRNA	00.073.0.02.	*Rubivirus*				
pos ssRNA	00.073.0.02.001.	*Rubella virus*		respiratory route	often unapparent infections; maculopapular rash, lymphadenopathy, fever, conjunctivitis, sore throat, arthralgia; congenital infection	B06.0
pos ssRNA						B06.1
pos ssRNA						B06.2
pos ssRNA						O35.0
pos ssRNA						O98.5

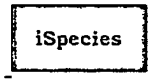
Gemone	Vcode/description	Virus name/Taxonomic list	Acronym	transmission	signs and symptoms	ICD-10 code
pos ssRNA	00.026.	*Flaviviridae*				
pos ssRNA	00.026.0.01.	*Flavivirus*				
pos ssRNA	00.026.0.01.026.	*Kyasanur Forest disease virus*	(KFDV)	tick-borne	encephalitis	A98.2
pos ssRNA	00.026.0.01.034.	*Omsk hemorrhagic fever virus*	(OHFV)	tick-borne	encephalitis	A98.1
pos ssRNA	00.026.0.01.036.	*Powassan virus*	(POWV)	tick-borne	encephalitis	A84.8

pos ssRNA	00.026.0.01.028.	*Louping ill virus*	(LIV)	tick-borne	encephalitis	A84.8
pos ssRNA	00.026.0.01.046.	*Tick-borne encephalitis virus*	(TBEV)	tick-borne	European subtype	A84.0
pos ssRNA					Far Eastern subtype	A98.5
pos ssRNA					(Russian spring-summer encephalitis)	A84.1
pos ssRNA					Siberian subtype	A84.8
pos ssRNA						A84.9
pos ssRNA	00.026.0.01.013.	*Dengue virus*	(DENV)	arthropod-borne, mosquitoes	Infection with any dengue serotype (1-4) can be asymptomatic or can cause dengue, dengue hemorrhagic fever (DHF), or dengue shock syndrome (DSS). DHF and DSS are life-threatening conditions.	A90
pos ssRNA						A91
pos ssRNA	00.026.0.01.019.	*Japanese encephalitis virus*	(JEV)	arthropod-borne, mosquitoes	encephalitis	A83.0
pos ssRNA	00.026.0.01.032.	*Murray Valley encephalitis virus*	(MVEV)	arthropod-borne, mosquitoes	encephalitis	A83.4
pos ssRNA					strain: Alfuy virus	
pos ssRNA	00.026.0.01.044.	*St. Louis encephalitis virus*	(SLEV)	arthropod-borne, mosquitoes		A83.3
pos ssRNA	00.026.0.01.051.	*West Nile virus*	(WNV)	arthropod-borne, mosquitoes	encephalitis	A83.4
pos ssRNA					Australian strain: Kunjin virus (KUNV)	A92.3
pos ssRNA	00.026.0.01.017.	*Ilheus virus*		arthropod-borne, mosquitoes	encephalitis	A83.6
pos ssRNA					strain: Rocio virus (ROCV)	
pos ssRNA	00.026.0.01.053.	*Yellow fever virus*	(YFV)	arthropod-borne, mosquitoes	hepatitis, fever	A95.0
pos ssRNA						A95.1
pos ssRNA						A95.9
pos ssRNA	00.026.0.01.002.	*Apoi virus*	(APOIV)	no known arthropod vector	zoonotic	
pos ssRNA	00.026.0.03.	*Hepacivirus*				
pos ssRNA	00.026.0.03.001.	*Hepatitis C virus*		direct contact, fecal-oral route	acute hepatitis	B17.1
pos ssRNA						B18.2
pos ssRNA	00.026.0.05.001.	*GB virus B*	(GBV-B)	fecal-oral route, transfusion, injection	acute and chronic hepatitis	B17.8
pos ssRNA						B18.8

pos ssRNA	00.026.0.04.001.	*GB virus A*	(GBV-A)	fecal-oral route, transfusion, injection	acute, chronic hepatitis	B17.8
pos ssRNA	00.026.0.84.002.	*(GBV-A-like agents)*				B18.8
Gemone	**Vcode/description**	**Virus name/Taxonomic list**	**Acronym**	**transmission**	**signs and symptoms**	**ICD-10 code**
Prions	90.001.0.01.	*Prions*			(agents of spongiform encephalitis)	A81.9
Prions	90.001.0.01.008.	*Creutzfeldt-Jakob-Disease*	(CJD)		HuPrPSc HuPrPCJD	A81.0
Prions	90.001.0.01.007.	*Kuru*			HuPrPSc HuPrPKu	A81.8
Prions	90.001.0.01.009.	*Gerstmann-Straussler-Scheinker syndrome*	(GSS)		HuPrPSc HuPrPGSS	A81.8
Prions	90.001.0.01.010.	*Fatal familial insomnia*	(FFI)		HuPrPSc HuPrPFFI	A81.8

Comments to ICTVdB Management
Last Modified 07-12-2006 by Cornelia Büchen-Osmond

Additional access points to virus species lists, descriptions and images on the web: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A to Z List of Cancers

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Dictionary of Cancer Terms
NCI Drug Dictionary
Funding Opportunities
NCI Publications
Advisory Boards and Groups
NIH Calendar of Events
Español

Questions about cancer?

- 1-800-4-CANCER
- LiveHelp® online chat
- E-mail

NCI Highlights

Arsenic Compound Treats Uncommon Leukemia
The Nation's Investment in Cancer Research FY 2008
Statement on Fiscal Year 2007 Budget Request
Cancer Trends Progress Report: 2005 Update
NCAB Working Group Report on Biomedical Technology
Past Highlights

A - D | E - K | L - M | N - R | S - Z | All

A

Acute Lymphoblastic Leukemia, Adult
Acute Lymphoblastic Leukemia, Childhood
Acute Myeloid Leukemia, Adult
Acute Myeloid Leukemia, Childhood
Adrenocortical Carcinoma
Adrenocortical Carcinoma, Childhood
AIDS-Related Cancers
AIDS-Related Lymphoma
Anal Cancer
Appendix Cancer
Astrocytoma, Childhood Cerebellar
Astrocytoma, Childhood Cerebral

B

Basal Cell Carcinoma, see Skin Cancer (non-Melanoma)
Bile Duct Cancer, Extrahepatic
Bladder Cancer
Bladder Cancer, Childhood
Bone Cancer, Osteosarcoma/Malignant Fibrous Histiocytoma
Brain Stem Glioma, Childhood
Brain Tumor, Adult
Brain Tumor, Brain Stem Glioma, Childhood
Brain Tumor, Cerebellar Astrocytoma, Childhood
Brain Tumor, Cerebral Astrocytoma/Malignant Glioma, Childhood
Brain Tumor, Ependymoma, Childhood
Brain Tumor, Medulloblastoma, Childhood
Brain Tumor, Supratentorial Primitive Neuroectodermal Tumors, Childhood
Brain Tumor, Visual Pathway and Hypothalamic Glioma, Childhood
Brain Tumor, Childhood (Other)
Breast Cancer

Breast Cancer and Pregnancy
Breast Cancer, Childhood
Breast Cancer, Male
Bronchial Adenomas/Carcinoids, Childhood
Burkitt's Lymphoma

C

Carcinoid Tumor, Childhood
Carcinoid Tumor,Gastrointestinal
Carcinoma of Unknown Primary
Central Nervous System Lymphoma, Primary
Cerebellar Astrocytoma, Childhood
Cerebral Astrocytoma/Malignant Glioma, Childhood
Cervical Cancer
Childhood Cancers
Chronic Lymphocytic Leukemia
Chronic Myelogenous Leukemia
Chronic Myeloproliferative Disorders
Colon Cancer
Colorectal Cancer, Childhood
Cutaneous T-Cell Lymphoma, see Mycosis Fungoides and Sézary Syndrome

D

[No Entries]

E

Endometrial Cancer
Ependymoma, Childhood
Esophageal Cancer
Esophageal Cancer, Childhood
Ewing's Family of Tumors
Extracranial Germ Cell Tumor, Childhood
Extragonadal Germ Cell Tumor
Extrahepatic Bile Duct Cancer
Eye Cancer, Intraocular Melanoma
Eye Cancer, Retinoblastoma

F

[No Entries]

G

Gallbladder Cancer
Gastric (Stomach) Cancer
Gastric (Stomach) Cancer, Childhood
Gastrointestinal Carcinoid Tumor

Gastrointestinal Stromal Tumor (GIST)
Germ Cell Tumor, Extracranial, Childhood
Germ Cell Tumor, Extragonadal
Germ Cell Tumor, Ovarian
Gestational Trophoblastic Tumor
Glioma, Adult
Glioma, Childhood Brain Stem
Glioma, Childhood Cerebral Astrocytoma
Glioma, Childhood Visual Pathway and Hypothalamic

H

Hairy Cell Leukemia
Head and Neck Cancer
Hepatocellular (Liver) Cancer, Adult (Primary)
Hepatocellular (Liver) Cancer, Childhood (Primary)
Hodgkin's Lymphoma, Adult
Hodgkin's Lymphoma, Childhood
Hodgkin's Lymphoma During Pregnancy
Hypopharyngeal Cancer
Hypothalamic and Visual Pathway Glioma, Childhood

I

Intraocular Melanoma
Islet Cell Carcinoma (Endocrine Pancreas)

J

[No Entries]

K

Kaposi's Sarcoma
Kidney (Renal Cell) Cancer
Kidney Cancer, Childhood

L

Laryngeal Cancer
Laryngeal Cancer, Childhood
Leukemia, Acute Lymphoblastic, Adult
Leukemia, Acute Lymphoblastic, Childhood
Leukemia, Acute Myeloid, Adult
Leukemia, Acute Myeloid, Childhood
Leukemia, Chronic Lymphocytic
Leukemia, Chronic Myelogenous
Leukemia, Hairy Cell
Lip and Oral Cavity Cancer
Liver Cancer, Adult (Primary)

Liver Cancer, Childhood (Primary)
Lung Cancer, Non-Small Cell
Lung Cancer, Small Cell
Lymphoma, AIDS-Related
Lymphoma, Burkitt's
Lymphoma, Cutaneous T-Cell, see Mycosis Fungoides and Sézary Syndrome
Lymphoma, Hodgkin's, Adult
Lymphoma, Hodgkin's, Childhood
Lymphoma, Hodgkin's During Pregnancy
Lymphoma, Non-Hodgkin's, Adult
Lymphoma, Non-Hodgkin's, Childhood
Lymphoma, Non-Hodgkin's During Pregnancy
Lymphoma, Primary Central Nervous System

M

Macroglobulinemia, Waldenström's
Malignant Fibrous Histiocytoma of Bone/Osteosarcoma
Medulloblastoma, Childhood
Melanoma
Melanoma, Intraocular (Eye)
Merkel Cell Carcinoma
Mesothelioma, Adult Malignant
Mesothelioma, Childhood
Metastatic Squamous Neck Cancer with Occult Primary
Mouth Cancer
Multiple Endocrine Neoplasia Syndrome, Childhood
Multiple Myeloma/Plasma Cell Neoplasm
Mycosis Fungoides
Myelodysplastic Syndromes
Myelodysplastic/Myeloproliferative Diseases
Myelogenous Leukemia, Chronic
Myeloid Leukemia, Adult Acute
Myeloid Leukemia, Childhood Acute
Myeloma, Multiple
Myeloproliferative Disorders, Chronic

N

Nasal Cavity and Paranasal Sinus Cancer
Nasopharyngeal Cancer
Nasopharyngeal Cancer, Childhood
Neuroblastoma
Non-Hodgkin's Lymphoma, Adult
Non-Hodgkin's Lymphoma, Childhood
Non-Hodgkin's Lymphoma During Pregnancy
Non-Small Cell Lung Cancer

O

Oral Cancer, Childhood
Oral Cavity Cancer, Lip and
Oropharyngeal Cancer
Osteosarcoma/Malignant Fibrous Histiocytoma of Bone
Ovarian Cancer, Childhood
Ovarian Epithelial Cancer
Ovarian Germ Cell Tumor
Ovarian Low Malignant Potential Tumor

P

Pancreatic Cancer
Pancreatic Cancer, Childhood
Pancreatic Cancer, Islet Cell
Paranasal Sinus and Nasal Cavity Cancer
Parathyroid Cancer
Penile Cancer
Pharyngeal Cancer
Pheochromocytoma
Pineoblastoma and Supratentorial Primitive Neuroectodermal Tumors, Childhood
Pituitary Tumor
Plasma Cell Neoplasm/Multiple Myeloma
Pleuropulmonary Blastoma
Pregnancy and Breast Cancer
Pregnancy and Hodgkin's Lymphoma
Pregnancy and Non-Hodgkin's Lymphoma
Primary Central Nervous System Lymphoma
Prostate Cancer

Q

[No Entries]

R

Rectal Cancer
Renal Cell (Kidney) Cancer
Renal Cell (Kidney) Cancer, Childhood
Renal Pelvis and Ureter, Transitional Cell Cancer
Retinoblastoma
Rhabdomyosarcoma, Childhood

S

Salivary Gland Cancer
Salivary Gland Cancer, Childhood
Sarcoma, Ewing's Family of Tumors
Sarcoma, Kaposi's
Sarcoma, Soft Tissue, Adult

Sarcoma, Soft Tissue, Childhood
Sarcoma, Uterine
Sézary Syndrome
Skin Cancer (non-Melanoma)
Skin Cancer, Childhood
Skin Cancer (Melanoma)
Skin Carcinoma, Merkel Cell
Small Cell Lung Cancer
Small Intestine Cancer
Soft Tissue Sarcoma, Adult
Soft Tissue Sarcoma, Childhood
Squamous Cell Carcinoma, see Skin Cancer (non-Melanoma)
Squamous Neck Cancer with Occult Primary, Metastatic
Stomach (Gastric) Cancer
Stomach (Gastric) Cancer, Childhood
Supratentorial Primitive Neuroectodermal Tumors, Childhood

T

T-Cell Lymphoma, Cutaneous, see Mycosis Fungoides and Sézary Syndrome
Testicular Cancer
Throat Cancer
Thymoma, Childhood
Thymoma and Thymic Carcinoma
Thyroid Cancer
Thyroid Cancer, Childhood
Transitional Cell Cancer of the Renal Pelvis and Ureter
Trophoblastic Tumor, Gestational

U

Unknown Primary Site, Carcinoma of, Adult
Unknown Primary Site, Cancer of, Childhood
Unusual Cancers of Childhood
Ureter and Renal Pelvis, Transitional Cell Cancer
Urethral Cancer
Uterine Cancer, Endometrial
Uterine Sarcoma

V

Vaginal Cancer
Visual Pathway and Hypothalamic Glioma, Childhood
Vulvar Cancer

W

Waldenström's Macroglobulinemia
Wilms' Tumor
Women's Cancers

X

[No Entries]

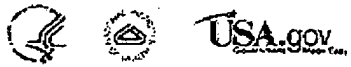
Y

[No Entries]

Z

[No Entries]

^ Back to Top



Docket No. 071949-7002
Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Michael Whittaker

Title: METHODS AND COMPOSITIONS FOR MEASURING BIOLOGICALLY ACTIVE NATRIURETIC PEPTIDES AND FOR IMPROVING THEIR THERAPEUTIC POTENTIAL

Appl. No.: 10/645,874

Filing Date: August 20, 2003

Examiner: Leon Yun Bon Lum

Art Unit: 1641

CERTIFICATE OF MAILING
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date below.

Vanessa Pak
(Printed Name)

Vanessa Pak
(Signature)

5-24-07
(Date of Deposit)

DECLARATION OF IAN REILLY UNDER 37 C.F.R §1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Ian Reilly, hereby declare as follows:

1. I am a physician specializing in emergency medicine with a practice in San Diego, CA. I received my M.D. from the Keck School of Medicine of the University of Southern California in 2000; completed my internship at Scripps Mercy Hospital in San Diego in 2001; and completed my residency in Emergency Medicine at the University of California School of Medicine in 2004. In addition to my practice, I was also employed as Assistant Medical Director at Biosite Incorporated, which is the assignee of the present application, from July 2004 through October 2006. I continue to act as a paid consultant to Biosite Incorporated on medical issues from time to time. A copy of my *curriculum vitae* is attached to this declaration.

2. I have been told that the claims of the present patent application refer variously to (i) methods of inhibiting degradation of a natriuretic peptide present in a subject (claim 29); (ii) methods for increasing the level of natriuretic peptide function in a subject (claim 32); and (iii) methods of treatment of a subject (claim 43). In each case, these claims include a step of selecting a subject on the basis of a diagnosis of congestive heart failure; and administering one or more inhibitors of prolyl-specific dipeptidyl peptidase ("DPP") to that subject.

3. I have also been told that the patent examiner has rejected certain claims of the present patent application as allegedly being anticipated by Haffner *et al.*, a U.S. Patent Application published as US2004/0167341; and other claims as allegedly being obvious over the combination of Haffner *et al.* with each of De Meester *et al., Biochem. Pharmacol.* 54: 173-79, 1997, Bergmann *et al.*, U.S. Patent 6,756,483, and Mills *et al., J. Am. Coll. Cardiol.* 34: 155-62, 1999. In the basis for each rejection, Haffner *et al.* is relied upon for supposedly "teach[ing] a method for treating congestive heart failure by administering to a patient a compound that inhibits a dipeptidyl peptidase, including DPP-IV. See page 3, sections 0027-0028." Office Action, page 3.

4. I have been asked to comment on whether or not one skilled in the art would understand Haffner *et al.* to teach that one should select a subject on the basis of a diagnosis of congestive heart failure, and that one should administer one or more inhibitors of prolyl-specific dipeptidyl peptidase ("DPP") to a subject selected on that basis. For the following reasons, I conclude that one skilled in the art would not conclude that Haffner *et al.* contains such a teaching.

5. According to its abstract, Haffner *et al.* is directed to "novel compounds... for inhibiting serine proteases... such as dipeptidyl peptidase IV." The Examiner refers specifically to the following section of Haffner *et al.*:

> The present invention also includes a method of inhibiting a post proline/analine cleaving protease comprising administering a compound of the present invention as herein described. Preferably, the post proline/analine cleaving protease is a serine protease. Preferably, the serine protease is a dipeptidyl peptidase. In one aspect preferably the dipeptidyl peptidase is DPP-II. In another aspect preferably the dipeptidyl peptidase is DPP-IV.

> The present invention also includes a method for the treatment or prophylaxis of metabolic disorders, gastrointestinal disorders, viral disorders, inflammatory disorders, diabetes, obesity, hyperlipidemia, dermatological or mucous membrane disorders, psoriasis, intestinal distress, constipation, autoimmune disorders, encephalomyelitis, complement mediated disorders, glomerulonepritis, lipodystrophy, tissue damage, psychosomatic, depressive, and neuropsychiatric disorders, HIV infection, allergies, inflammation, arthritis, transplant rejection, high blood pressure, congestive heart failure, tumors, and stress-induced abortions comprising administering a compound of the present invention as herein described. Preferably, the compound of the present invention as herein described is administered for the treatment or prophylaxis of diabetes, more preferably Type II diabetes.

6. I begin my analysis by noting that nothing in Haffner *et al.*, including the passage quoted above, explicitly states that one should select a subject for treatment with DPP inhibitors on the basis of a diagnosis of congestive heart failure. Haffner *et al.* does not inform the skilled artisan whether a particular cited condition is treatable directly, prophylactically, or potentially by both approaches by administering a DPP inhibitor. Instead, this section refers to treatment or prophylaxis in the alternative for the specified conditions as a group, leaving unclear whether any individual condition can serve as a basis for selecting a subject for treatment, can only be addressed prophylactically and so cannot serve as a basis for selecting a subject for treatment, or may be addressed using both approaches.

7. Furthermore, it is also noteworthy that the section of Haffner *et al.* referred to by the Examiner and quoted above would be viewed by one of skill in the art to encompass literally hundreds of diverse conditions, the vast majority of which have no known direct relationship to DPP or to DPP inhibitors. And Haffner *et al.* offers no description of any common physiological basis by which the skilled artisan could reasonably believe DPP inhibitors would be of either a therapeutic or prophylactic benefit across this array of conditions. So, while Haffner *et al.* indicates that DPP-IV is believed to be "involved in" such a vast array of conditions, the question unanswered by Haffner *et al.* is "how."

8. The skilled artisan would, for example, ask what link is presented in Haffner *et al.* that would permit one to take seriously an assertion that DPP inhibitors could treat each of "psychosomatic disorders," "tissue damage," "viral disorders," "congestive heart failure," and "tumors." While a relationship of DPP inhibitors to glucose metabolism is well explained and documented in Haffner *et al.*, the artisan will look in vain for evidence of such a link to the

remainder of the array of conditions presented in Haffner *et al.* And the artisan would take note of the fact that some of these terms, such as "viral disorders," "tumors," and "tissue damage" are terms that themselves are both sweeping in breadth and unconnected physiologically. How, for example, would the skilled artisan approach a claim that one might use the same compounds to treat influenza (a viral disease), AIDS (another viral disease), ovarian cancer (a tumor), burns (a type of tissue damage), and congestive heart failure? The answer is "with great skepticism."

9. It appears to me as one skilled in the art that Haffner *et al.* has been written to sweep in as many major disease processes affecting human beings as possible, with a hope that someone in the future might discover some new use of DPP inhibitors that Haffner *et al.* might then claim to cover. Also, as one skilled in the art, I would not consider Haffner *et al.* to provide a credible teaching that the large majority of conditions within Haffner *et al.*'s "wish list" could be used to select subjects for treatment with DPP inhibitors. And, in particular, I would not consider Haffner *et al.* to provide a credible teaching that a subject should be selected for such treatment on the basis of a diagnosis of congestive heart failure.

10. For the skilled artisan to determine which, if any, of the myriad conditions presented in Haffner *et al.* could potentially be used to select subjects for treatment, the skilled artisan must embark on a research program in which each possible condition is considered in turn, with the faintest of hope that one will be successful. The quantity of experimentation required would be considered to be both large and unguided. And, with regard to the present claims, one skilled in the art would not simply focus on congestive heart failure in this regard, as there is no basis provided in Haffner *et al.* for selecting a subject on the basis of a diagnosis of congestive heart failure.

11. When viewed in this light, it is apparent that Haffner *et al.* does not teach the step of selecting a subject for treatment with DPP inhibitors based a diagnosis of congestive heart failure.

12. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information or belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United

States Code, and that such willful false statements may jeopardize the validity of the captioned patent application or any patent issued therefrom.

4/25/07

Date

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Curriculum Vitae

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MD 5/00

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Honors/Awards:
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UCSD Emergency Medicine Resident of the year 2004 – staff award

Academic Activities:
Reilly, Ian : Pseudotumor Cerebri. In: Rosen and Barkin's 5-Minute Emergency Medicine Consult (second edition). Schaider J, Hayden SR, Wolfe R, Barkin RM, Rosen P (Eds.); Philadelphia: Lippincott Williams & Wilkins, 2003

Reilly, Ian, Ly, B: Tube Thoracostomy: Comparison of a Method Utilizing a New Forceps versus Conventional Technique in a Cadaver Model, abstract presentation at the Mediterranean Emergency Medicine Conference, Barcelona Spain, 9/03
Reilly, Ian, Chan, T. : Comparison of Arterial pCO2 to End Tidal CO2 Obtained by an Oral Nasal Cannula in an Emergency Department Setting (ongoing research).

Language Skills:
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Presentations:
FOMA (Florida Osteopathic Medical Association) Annual Conference2/2005: BNP as a Diagnostic Aid in CHF
Hospital Corporation of America Stroke initiative meeting 7/2005: Emergency Department Perspective on Stroke
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